A “weakly relative” poverty line for South Africa

APPLYING CHEN AND RAVALLION (2012) TO THE SOUTH AFRICAN CASE

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Absolute poverty lines in the developing world

- At country level: developing countries typically use poverty lines that aim to have the same real value at different dates and places.

- At the global level, the World Bank's widely-used "$1-a-day" line is absolute in that it aims to have the same purchasing power in different countries and at different dates.

Relative poverty in the developed world

- The more common practice in most OECD countries and Eurostat has been to set the poverty line as a constant proportion - typically 40-60% - of the (date and country-specific) mean or median income:

$$Z_i = kM_i$$

Z_i = poverty line for country i; M_i = mean income for country i; $0 < k < 1$

- This is a <u>strongly relative poverty line</u>

Two justifications for a relative approach

1. Welfarist argument

   people gain utility from their income relative to the mean or median income of their country.

1. Capabilities argument

   poverty lines should allow for differences in the cost of social inclusion.

Social inclusion costs

- Idea that socially specific expenditures can be necessary for social inclusion is very long-standing – e.g. Adam Smith:

  "A linen shirt, for example, is, strictly speaking, not a necessary of life. The Greeks and Romans lived, I suppose, very comfortably though they had no linen. But in the present times, through the greater part of Europe, a creditable day-labourer would be ashamed to appear in public without a linen shirt, the want of which would be supposed to denote that disgraceful degree of poverty which, it is presumed, nobody can well fall into without extreme bad conduct."

Ravallion and Chen's critiques of "strongly relative" lines

- Do not allow for poverty reduction from distribution-neutral growth
- Welfarist justification claims that people attach value to their income relative to the mean – but it is implausible that people only care about relative position
- 'Capabilities' justification – it is implausible that the cost of social inclusion goes to zero in the limit (i.e. it is surely bounded below)
- Elasticity of the relative poverty line to mean income is therefore a key concern for Ravallion and Chen

The Weak Relativity Axiom

- Hence they propose that poverty measures should follow their "Weak relativity axiom" (WRA):

If all incomes increase (decrease) by the same proportion then the aggregate poverty measure must fall (rise).

- This is satisfied for standard poverty measures so long as the elasticity of the line to mean income is <1.
- Allows for RD and social inclusion costs, but imposes a limit on the weight attached to such effects
  - As we see over the next few slides

WRA and the welfarist approach

Welfare is dependent on own income and relative income:

$$W = W\left(Y, \frac{Y}{M}\right) \qquad (1)$$

Y = own income; M = mean income

Poverty line Z is implicitly defined by:

$$\bar{W} = W\left(Z, \frac{Z}{M}\right) \qquad (2)$$

where $\bar{W}$ is the poverty line in welfare space (the poverty line is absolute in welfare space)

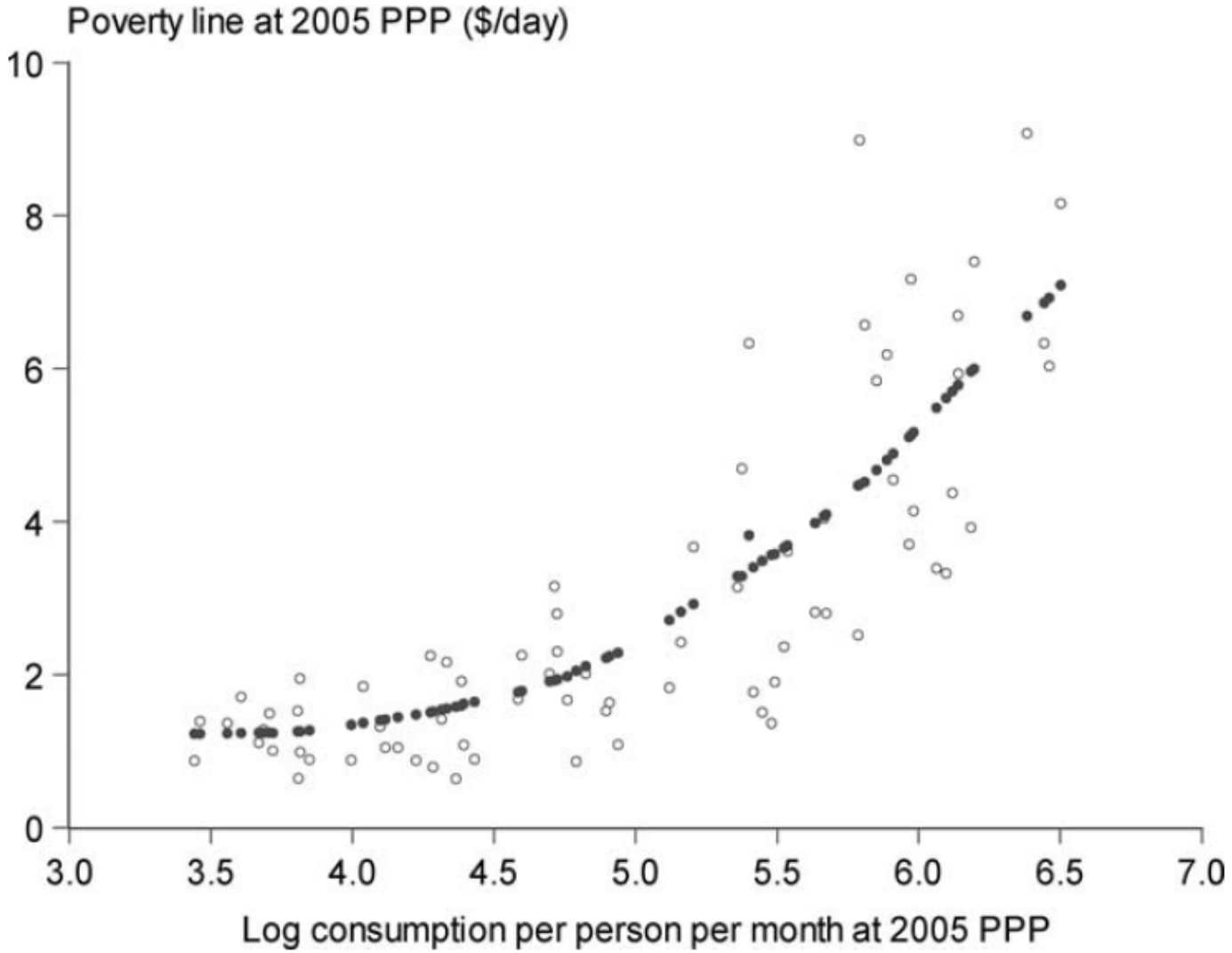
Atkinson and Bourguignon capabilities approach

- Atkinson and Bourguignon (AB) create a poverty line which makes provision for 2 capabilities: physical survival, and social inclusion.
- Each capability has corresponding poverty line, and a person is non-poor only if they have the means to satisfy both capabilities

$$Z_i^{AB} = \max(Z^*, kM_i) \quad (0 < k < 1) \tag{3}$$

Z^* = minimum expenditure for physical survival; kM_i = social inclusion cost for country i, where k is some constant and M_i = mean income

FIGURE 1.—NATIONAL POVERTY LINES PLOTTED AGAINST MEAN CONSUMPTION



Fitted values use a lowess smoother with bandwidth = 0.8.
Source: Ravallion et al. (2009).

Ravallion and Chen critique of AB

- Using original database of international poverty lines used to create Dollar-a-day measure, AB calculate k=0.37
- BUT this measure still creates a poverty line which is unit elastic with respect to mean income when $M_i > \frac{Z^*}{k}$
- Suggests that cost of social inclusion is directly proportional to mean income. Implies that in the limit as mean income approaches zero, cost of social inclusion vanishes
  - Ravallion and Chen argue that this is implausible – even people in very poor societies will have social inclusion costs
- They also argue that it is undesirable to have a poverty line which does not allow inequality-neutral growth to reduce poverty

Ravallion and Chen "generalised AB line"

- So they create "Generalized AB poverty line" which has a minimum cost of social inclusion and a varying elasticity to mean income

$$Z_i = \max(Z^*, \alpha + kM_i) \quad (\alpha \geq 0) \qquad (4)$$

α = lower bound to social inclusion needs

Note: elasticity of Z_i to M_i is now strictly less than 1 for $\alpha > 0$, and will tend to 1 in the limit as M_i goes to infinity

Welfarist interpretation of generalised AB line

$$W(\cdot) = Y \qquad \text{if } M \leq M^* \equiv \frac{Z^* - \alpha}{k} \qquad (5a)$$

$$= Y\left(1 - \frac{k(M - M^*)}{Y}\right) \qquad \text{if } M > M^* \qquad (5b)$$

Concerns about relative deprivation emerge only when mean income is above some critical value, and above that the utility from own consumption is discounted according to the degree of relative deprivation

Calibrating this equation to the empirical relationship

- Like AB, Ravallion and Chen set $Z^* =$ \$1.25-a-day as a lower bound for physical survival
- When calibrating the weakly relative line, there are two approaches:
  1. Relate national poverty line to private consumption expenditure from National Accounts (initial 2011 paper)
  2. Relate national poverty lines to mean consumption calculated from survey data (Chen and Ravallion 2012 revision)
- Values for k and α change depending on method

Calibrated lines

Calibrated with national accounts (NA) data (Ravallion and Chen 2011):

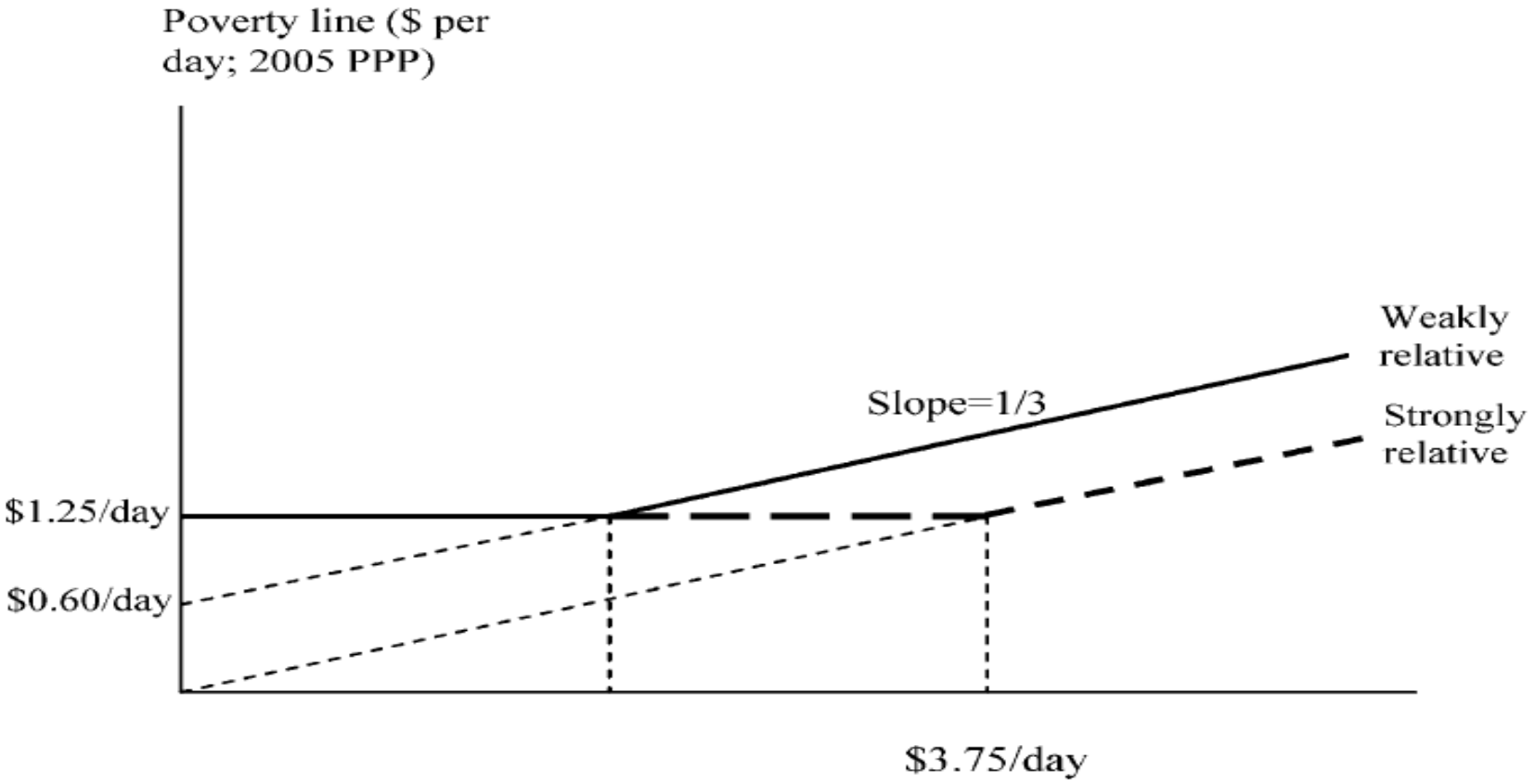
$$Z_i = \max\left(1.25, 0.60 + \frac{M_i}{3}\right) \quad (6)$$

Calibrated with survey data (Chen and Ravallion 2012):

$$Z_i = \max\left(1.25, \frac{1.25}{2} + \frac{M_i}{2}\right) \quad (7)$$

Unit: 2005 PPP dollars, per day

FIGURE 2.—WEAKLY RELATIVE POVERTY LINES



Application to South Africa

- Values of Z^* and α
  - PPP for individual consumption from 2005 round of International Comparison Program (ICP) of the World Bank (the round that Ravallion and Chen use for their estimates)
  - \$1 = R4.57 in 2005; \$1.25 = R5.71
  - Update by headline CPI inflation when necessary
- Value of M:

Mean consumption expenditure (constant 2011 monthly Rands)			
	2005	2011	real change
National Accounts (SARB)	2596	2900	11.7%
Survey Data (IES)	1854	2123	14.5%

SA lines 2005 and 2011

- NA method (SARB data)
  - $Z_t = \max\left(255,\ 122 + \frac{M_t}{3}\right)$
  - $Z_{2005} = \text{R}988$
  - $Z_{2011} = \text{R}1089$
- Survey method (using IES)
  - $Z_t = \max\left(255,\ 127 + \frac{M_t}{2}\right)$
  - $Z_{2005} = \text{R}1054$
  - $Z_{2011} = \text{R}1189$

- Units: constant 2011 monthly ZAR

Comparison to SA absolute poverty lines

Comparison with upper-lines (constant 2011 monthly Rands)			
Poverty line	2005	2011	
StatsSA 2015 upper		779	
SALDRU upper		998	
Ozler upper		1164	
Weakly relative (NA)	988	1089	(10% real change)
Weakly relative (survey)	1054	1189	(13% real change)

Comparison with food-lines (2011 Rands)	
Poverty line	2011
StatsSA 2015 food	335
SALDRU food	327
Ozler food	480
$1-a-day	255

Head-count ratios 2005 - 2011

Using NA-derived lines		
Poverty line	2005	2011
$1.25-a-day	14.1%	10.3%
Relative poverty	65.7%	61.1%
Constant 2005 line	65.7%	58.0%

Using survey-derived lines		
Poverty line	2005	2011
$1.25-a-day	14.1%	10.3%
Relative poverty	67.5%	63.6%
Constant 2005 line	67.5%	60.1%

A useful measure for South Africa?

- Strong theoretical arguments for considering a relative poverty line
- Examination of how mean income relates to national poverty lines is an appealing method for examining how perceptions of what constitutes poverty are related to mean income
- Useful to have a relative poverty measure which still allows distribution-neutral growth to reduce poverty, especially for South Africa. Also seems to be little theoretical reason to accept prevailing relative lines' assumption of direct proportionality to income
- Varying elasticity of poverty line to mean income is perhaps appealing, given some of the evidence. Also seems to be little reason to accept the alternative, of constant elasticity across different countries
- Does seem somewhat similar to local absolute lines, which implicitly contain ideas about what poverty means in SA

Some theoretical concerns

- Ravallion and Chen argument for a minimum cost to social inclusion needs is not satisfying: "*While one can agree that certain goods have a social role, it is hard to accept that the expenditure required to attain those goods is negligibly small for very poor people. Recalling Adam Smith's example of the role of a linen shirt in eighteenth-century Europe, a socially adequate shirt would not presumably have cost any less to the poorest person than the richest.*"
- Generalized AB line assumes that where $M < \frac{Z^* - \alpha}{k}$, there is no concern for either RD or social inclusion costs (unless Z* includes social inclusion costs, but still assumed constant). Why should elasticity=0, rather than just being low? [equations 5a and 5b above]

A few other concerns

- Survey method: may be spurious relationship between poverty line level and mean consumption when same survey is often used to calculate poverty line and mean income
  - Also not clear how well the survey version fits the data
- NA method: with differences between NA and survey estimates of consumption, may be inappropriate to use NA data to set poverty lines, and survey data to measure poverty using those lines
- Empirical implementation assumes "*that our global weakly relative poverty lines change over time consistently with the cross-sectional variation seen between countries*"